



The Science of a Healthier Life™

Life Extension.com

Winter Edition 2019-2020

FEATURE ARTICLES

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LIFE EXTENSION® MAGAZINE: NEW LOOK—SAME GREAT SCIENCE NEWS

A central graphic consisting of a large, light blue circle containing the text "Major Advance: Reduce & Resolve INFLAMMATION". The word "INFLAMMATION" is in red. Surrounding this central circle are ten smaller, circular icons in a light blue color, each containing a white line-art symbol representing various aspects of health and science: a person with arms raised, a molecular structure, a test tube, a DNA double helix, a hand holding a pill, a pile of pills, a pair of scissors, a heart, a water drop in a container, and a person's head with a brain symbol.

# Major Advance: Reduce & Resolve **INFLAMMATION**

ANNUAL  
**SuperSale**  
BEGINS!

PLUS: New Curcumin Delivers Whole-Body Benefits



# SuperSale

The **Life Extension®** annual **SUPER SALE** enables clients to obtain **premium-grade** nutrient formulas at the year's **lowest** prices.

Long-term supporters know that the **quality** of the products is backed by **Life Extension's** commitment to extended healthy lifespans.

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Per-Bottle Price

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BY WILLIAM FALOON

# Vast Improvement in Curcumin Bioavailability At a Lower Price

Dear Supporter,

**Curcumin** has the potential to transform medical practice.

Scientific studies reveal how curcumin **functions** to reduce risk for a range of **age-related** effects.<sup>1-6</sup>

But curcumin is poorly **absorbed** into the bloodstream.<sup>7</sup>

In order to garner its benefits, better forms of **curcumin** are needed to enhance its **bioavailability**.

## Improvements Began in the 1990s

Over the last three decades, different curcumin compounds were developed that are better **absorbed** compared to the **curcumin** that was originally introduced in the United States.

Before reaching the blood, **curcumin** undergoes changes in the **digestive tract** that decrease the amount of active **curcuminoids**. This deprives cells throughout the body of **optimal** effects.

A giant leap forward has occurred with a new formulation of **curcumin** that protects against these digestive changes.

The result is an **improved** ability of curcumin to deliver **whole-body** benefits.

## Difference Between Turmeric and Curcumin

**Turmeric** is a spice that has been used for thousands of years in South Asian cuisine.

**Curcumin** is the most biologically active compound in the turmeric plant.

The data about curcumin's health benefits have motivated researchers to find better ways to deliver more active "**free curcuminoids**" into the blood stream.

In the **1990s**, this was accomplished by adding **pip-erine**, an extract that increased curcumin absorption by mildly irritating the stomach lining.



A decade or so later, this method was improved upon by adding turmeric oil to boost curcumin absorption about **seven-fold**.

I am pleased to announce a new patented curcumin formulation that is better **protected** against changes in the intestines that limit systemic benefits. It is also far better **absorbed** than previous forms.

This enables more **free curcuminoids** to reach cells throughout the body.

## Clinically Studied Improvements

To assess the efficacy of this novel **curcumin**, several clinical trials have measured its effects on age-related factors that shorten healthy lifespans.

Some highlights from **human** studies using this new curcumin include:<sup>5,6,8-11</sup>

- Reduced fatigue, stress relief
- Improved quality-of-life scores
- Arterial protection
- Reduced homocysteine (**30%** lower)
- Increased HDL (**34%** higher)
- Improvement in liver enzymes (**30%** lower)
- Increased antioxidant enzymes (**25%** higher)
- Healthy inflammatory support (**27%** lower CRP and **15%** lower IL-6)
- **45.5-fold increase** in relative plasma bioavailability of free curcuminoids

What is the significance of these **improvements**? They represent potential **reversal** of several **aging biomarkers**.

These include reducing homocysteine, promoting arterial health, and improving inflammatory responses, along with increases in beneficial HDL cholesterol and quality-of-life scores.

These improvements correlate with published studies revealing curcumin’s potential to reduce the burden of **age-related** effects.

### Delivering Curcumin to the Brain

Curcumin has demonstrated effects in preclinical and animal trials that have led scientists to speculate that it might help protect memory function<sup>12-18</sup> in humans.

The challenge up until now has been to deliver adequate quantities of **curcuminoids** to brain cells. The **intestinal environment** alters curcumin’s composition in a way that reduces its **bioavailability**<sup>7,8</sup> to the whole body, including to the brain.

An ongoing study is looking at brain cells’ **activity** before and after oral ingestion of this new curcumin compound.<sup>19</sup>

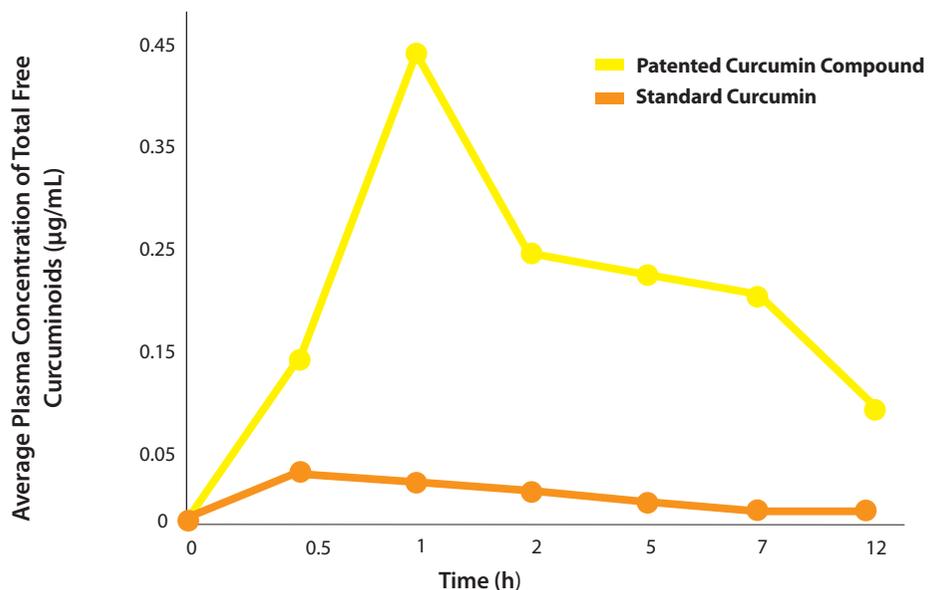
The preliminary results showed markedly **higher** brain cell functionality in as little as 30 minutes after ingesting **500 mg** of this highly **bioavailable** curcumin formulation.

These findings suggest this new form of **curcumin** delivers real-world **neurological** results as demonstrated by higher **EEG** (electroencephalogram) brain activity.

### Bioavailability of Free Curcuminoids

A novel form of curcumin has been shown to deliver the **highest** amounts of **free, active curcuminoids** to the bloodstream and broadest **tissue penetration** including the brain, liver, kidney, heart, intestine and spleen.<sup>20</sup>

A randomized, double-blind, crossover trial of 50 healthy adults reveals the superior **bioavailability** of this patented curcumin compound, as depicted in the graph to the right.<sup>8</sup>



- **45.5-fold increased total free curcuminoids** in plasma vs. standardized turmeric powder.
- More than **70%** of total plasma curcuminoids are in the active **free form** five hours after dosing.

Reference: *J Funct Foods*. 2016;22:578-87.

## Validating Tissue Penetration

To authenticate systemic **bioavailability**, an animal study measured **free curcuminoids** in heart, brain, kidney and other vital organs after supplementation with the new curcumin preparation.<sup>20</sup>

This type of study would be impossible to conduct in people.

The findings reveal markedly **higher** tissue levels of **free curcuminoids** throughout the animal's body using this novel formulation, compared to regular curcumin.<sup>20</sup>

The study also showed that **five hours** after ingestion, more than **70%** of **total plasma curcuminoids** were in the free, **active form** that can reach tissues.<sup>20</sup>

To put this into **human** perspective, the graph on the previous page shows a **45.5-fold increase** in plasma **free curcuminoids** in people after ingesting this **new curcumin**.<sup>8</sup>

Both the human and animal data were obtained by comparing turmeric standardized to **95% curcuminoids**, with this **new** highly **bioavailable curcumin** compound.

Taken together, these findings suggest this new curcumin formulation delivers **systemic** benefits that were previously unattainable.

## Reduced Curcumin Prices

The good news for **consumers** is that this **patented** form of curcumin competes in a **free market**.

So, instead of costing more, the **Life Extension Buyers Club** has arranged for our supporters to obtain this **improved** curcumin formula at a price **below** the cost of the previous high-quality (BCM-95) curcumin.

During our annual **Super Sale**, the savings are even greater.

We are publishing a landmark article in early **2020** that describes the enhanced **bioavailability** of this novel **curcumin** in specific detail.

In the meantime, this **new lower-priced** and more **highly absorbed** curcumin formula is available to readers right now!

To order any item at **Super Sale** prices, call **1-800-544-4440** (24 hours).

For longer life,



William Faloon, Co-Founder  
Life Extension Buyers Club



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## IN THIS ISSUE...

**Chronic inflammation** is involved with virtually **every** degenerative illness.

**Fish oil, vitamin D, and curcumin** inhibit pro-inflammatory factors, but cannot always resolve ongoing damage in **elderly** persons.

Page 18 of this special **Life Extension**<sup>®</sup> edition describes a fatty-acid extract that can resolve destructive **inflammatory** processes and help restore tissues to a healthier state.

New findings validate the **age-reversal** potential of removing **senescent cells**. An article on page 8 in this month's issue describes recently published results.

We get lots of inquiries about the best way to boost **CoQ10** blood levels. These questions and more are addressed on page 30 of this special edition.

For new readers, we have a brief section on page 41 describing the convenience of calling or emailing our **Wellness Specialists**.

Our courteous staff is available to answer your questions about anything we publish or other health issues about which you want to inquire. Trained personnel answer our phones live, **24 hours** a day, every day, to help support you.

There has never been an organization that comes close to **Life Extension**<sup>®</sup> as it relates to identifying, investigating and disseminating scientific findings about living longer in better health.

This special edition highlights scientific advances published in **2019**.

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**NEW!**

# Highly Absorbable **CURCUMIN**

**Curcumin Elite™** is a patented **extract** from **turmeric root** that provides **45 times** greater **free curcuminoid** bio-availability than standardized turmeric powder.

**Curcumin Elite™** contributes to *higher blood levels* of bio-active curcuminoids that **stay in the body longer** to provide more health benefits.

**Advanced Curcumin Elite™** contains the same optimal **500 mg** potency of **curcumin** with the *added* benefits of **ginger** and additional **turmeric** actives.

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Bioavailability  
At a Lower Price*



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**SUPER SALE PRICING!**

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4 bottles \$16.20 each

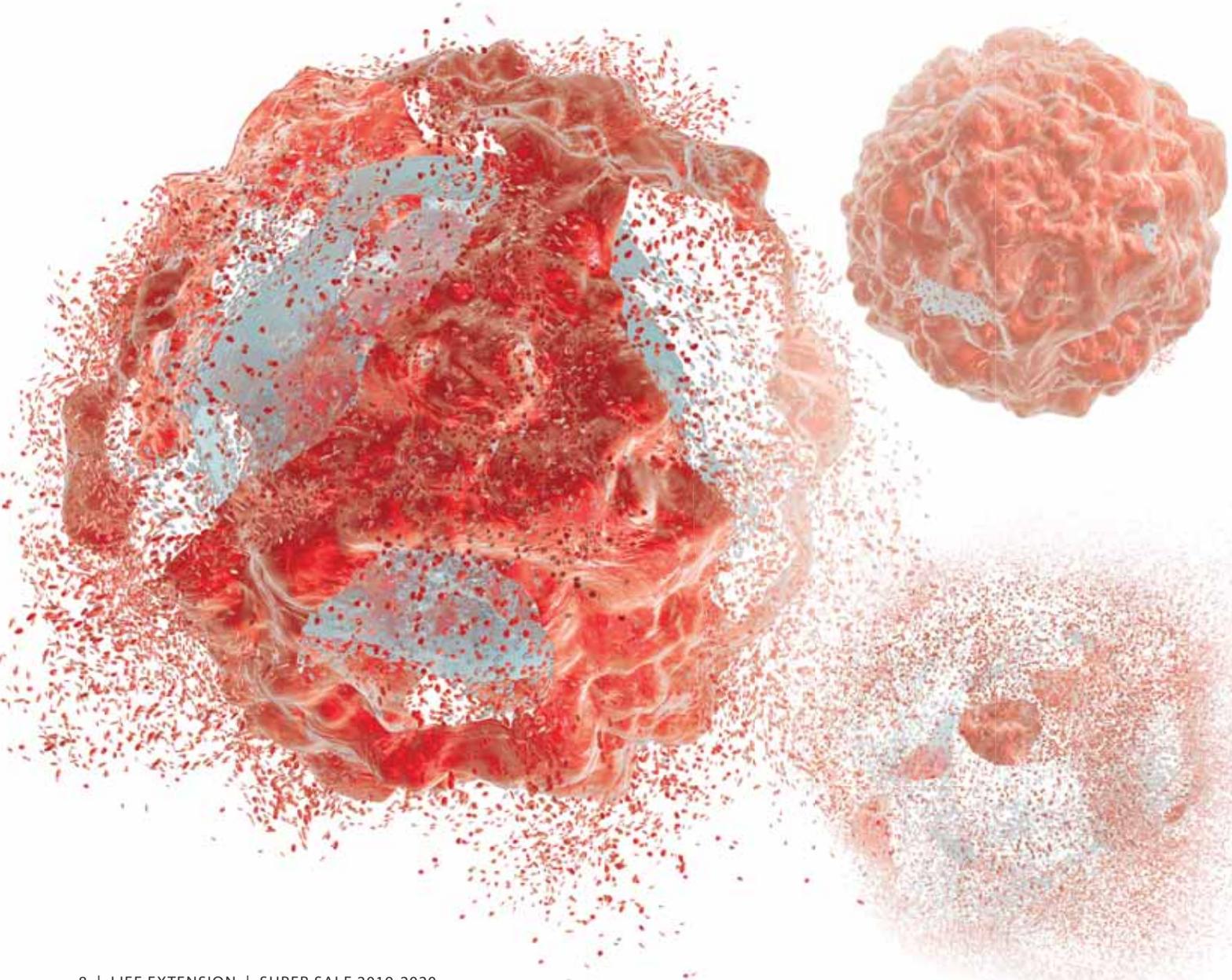
For full product description and to order  
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# Combat Aging by Reducing the Senescent Cell Burden





BY SEAN FIELD

Published research conducted at the **Mayo Clinic** and other prestigious institutions is revolutionizing medicine.

The impact of these findings is the potential to **delay** and **reverse** the adverse effects of aging.

A major factor in **old-age decline** is the accumulation of **senescent cells** that:

- **Impede Organ Function**
- **Create Chronic Inflammation**
- **Emit Protein-Destroying Enzymes**
- **Shorten Healthy Lifespan**

Compounds that circumvent this aging **mechanism** are called **senolytics**.

“**Seno**” refers to **old cells** that secrete **toxic chemicals**.

“**Lytic**” refers to their **destruction**.

**Senolytic** compounds selectively *destroy* these **old** (senescent) **cells**.

Several landmark studies on **senolytic therapy** have recently been published.

They demonstrate that **senolytics** not only contribute to **healthy longevity**, but also show promise as treatment for heart failure, Alzheimer’s and lung disease.<sup>1-3</sup>

These studies, many published in **2019**, corroborate the potential of **senolytics** to revitalize aging bodies by removing **senescent cells**.

This article provides updates to research we reported on last year. It also describes methods by which you can start purging your body of worn out, yet highly metabolic and very toxic **senescent cells**.





## The Problem of Cellular Senescence

The body normally gets rid of damaged, abnormal cells as part of its daily functioning. These damaged cells are programmed to die off, through a process called **apoptosis**, preventing the buildup of dysfunctional cells in tissues.

As we get older, that process changes. Elderly cells cease *functioning* properly, fail to accomplish their normal tasks, and lose their ability to divide. But instead of dying off, these cells linger and accumulate in various tissues.

This is known as **cellular senescence**. Scientists have discovered that these dysfunctional, older cells are a major contributor to many of the ailments that come with advancing age.

In fact, cellular senescence is believed to be one of the major causes of aging, loss of function with age, and risk for many age-related diseases, including diabetes, obesity, cardiovascular disorders, vision loss, dementia, arthritis, and cancer.<sup>4-8</sup>

**Senescent cells** create these problems in two major ways.

First, because they do not function normally, they prevent surrounding cells and tissues from functioning at peak capacity.

Second, they *spread* this dysfunction to surrounding healthy cells and throughout the whole body by secreting harmful compounds that, as a group, are known as the **senescence-associated secretory phenotype**.<sup>9,10</sup>

These compounds encourage *other* cells to enter the same senescent state, so this destructive process continues.

They also activate **chronic inflammation**, which has long been recognized as a major cause of premature aging and age-related diseases.

## Senolytics Eliminate Senescent Cells

Scientists set out to find a way to get rid of the problematic senescent cells, while preserving healthy, functional cells.

They found the solution in **senolytics**.<sup>11</sup> These compounds have the ability to selectively trigger cell death in abnormal, senescent cells.

A number of these substances have already been discovered, including naturally occurring compounds and synthetic drugs.

The most widely studied senolytic regimen originated at the Mayo Clinic. It consists of two senolytic compounds in combination, **quercetin** and **dasatinib**.

**Quercetin** is a natural compound found in many fruits and vegetables, while **dasatinib** is a drug used to treat leukemia. Together, they deliver a senolytic punch that has been shown to kill senescent cells and reverse age-related changes in cell culture and animal models.<sup>12</sup>

The dose schedule of **dasatinib** used in these studies is usually a fraction of what leukemia patients take.

## The First Human Senolytics Study

Testing the impact of senolytic therapy on human *longevity* is difficult, given the long timeframe needed to observe a significant change. But a **proof-of-concept trial**, to test whether senolytics have practical, clinical potential, has already been completed and its findings were published this year.<sup>2</sup>

Researchers at the Mayo Clinic and partner hospitals conducted a trial of **quercetin** and **dasatinib** senolytic therapy in patients with a lung disease known as **idiopathic pulmonary fibrosis**.

This condition leads to progressive changes in the lung tissue that make it difficult for the lungs to take in enough oxygen. That, in turn, causes breathing problems and deterioration in physical functioning until the patient dies. Although the underlying cause of the disease is not well understood, cellular **senescence** has been identified as a major contributing factor.

After baseline testing, subjects were placed on a senolytic regimen that included **1,250 mg/day** of **quercetin** and **100 mg/day** of **dasatinib**, given for three consecutive days each week for three weeks.

Despite the short duration of the trial, researchers observed some **improvements** in patients' physical **functioning** after the senolytic treatment.

Timed six-minute walking distance improved by **5%**, four-meter gait speed increased by **9%**, and timed chair-stands were completed **15%** faster.

Although this trial was relatively small, it is a major step in senolytic research. It demonstrates that senolytic therapy is feasible in humans and may have an impact on physical health related to chronic disease.

### Senolytics and Age-Related Heart Disease

Another study published this year set out to explore the impact of cellular senescence on the **heart** and whether **senolytic** interventions could alleviate age-related heart damage.<sup>1</sup>

First, researchers found that **senescent cell** accumulation impacts the aging heart.

Senescence is involved in **hypertrophy** (enlargement) of heart muscle cells, and **fibrosis** (fibrous stiffening) of heart muscle tissue. These disturbances contribute to declining heart function and play a role in many cases of heart failure.

Next, the researchers tested whether **senolytics** could reduce this damage to the heart.

Using a senolytic compound called **navitoclax** (a synthetic anti-cancer drug) in a mouse model of heart disease, scientists were able to demonstrate two important findings:

- 1) Senolytic therapy reduced the number of senescent heart muscle cells, on average, by approximately **80%**.
- 2) This reduction in senescence significantly reduced the hypertrophy and fibrosis present in the hearts of aged mice. A marker of hypertrophy was reduced by about **25%**, while the area of fibrosis was reduced by more than **40%**.

Combined with previous research showing that cellular senescence is a major contributor to blood vessel disease and to atherosclerotic plaque development, these findings have tremendous implications for cardiovascular disease, the most common cause of death worldwide.<sup>13,14</sup>

### Senolytics as Treatment for Alzheimer's

Studies of cellular senescence have also led to revelations in the search for effective treatments for Alzheimer's disease, the most common cause of dementia, characterized by progressive cognitive decline.

With Alzheimer's disease, abnormal accumulations of proteins, particularly **beta-amyloid** and **tau**, build up in the **brain**, impairing the function of surrounding nerve cells.

## Senolytic Therapy

- As the body ages, some cells become **senescent**, losing the ability to divide, while at the same time becoming **dys-functional** and contributing to dangerous, chronic inflammation.
- Cellular senescence is a major contributor to the aging of bodily tissues and the rapid deterioration of function.
- **Senolytics** are compounds that interfere with cellular senescence pathways, helping to eliminate these abnormal cells.
- Exciting, new studies published this year have shown that senolytics can have beneficial effects in both animal and human models.
- Two plant-based compounds, **quercetin** and **theaflavins**, provide senolytic mechanisms without relying on pharmaceuticals.

What You Need to Know



## Anti-Cancer Mechanisms of Theaflavins

**Theaflavins** share many of the **mechanistic** senolytic effects of **dasatinib** (such as inhibiting a regulatory protein called BCL-2).

**BCL-2** stands for “**B-cell lymphoma-2**.” An undesirable function of **BCL-2** is that it prevents **lymphoma** cells from undergoing **apoptosis**.

Encouraging **abnormal cells** to undergo **apoptosis** (programmed cell death) is a function sought by those seeking to prevent or treat **cancers**, as well as induce **senescent cells** to self-destruct.

So, compounds that **inhibit BCL-2**, be they **dasatinib** or **theaflavins**, appear to be something helpful to have in your body.

In the **May 17, 2019**, issue of the journal **Science**, a major article was published revealing **more** deleterious effects of **senescent cells**, including inhibiting **stem cell** function.

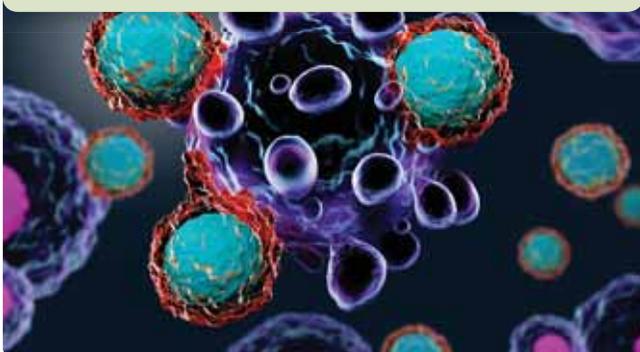
This **Science** article went on to show **senescent cell** secretions can contribute to **cancer** development. Here is a quote about how **senescent cell** secretions promote cancer:

**“[They] can stimulate neoplastic cell growth, tumor angiogenesis, and metastasis, thereby promoting development of late-life cancers.”**

The **Science** article suggested **senolytic** compounds may have further anti-cancer properties by concluding:

**“Indeed, elimination of senescent cells with aging attenuates tumor formation in mice, raising the possibility that senolysis might be an effective strategy to treat cancer.”**

These studies indicate that **mechanisms** by which **theaflavins** or **dasatinib** remove **senescent cells** may also have **anti-cancer** effects.



To date, conventional treatments attempting to reduce the burden of **amyloid** plaques in the brain have failed to produce clinical improvements in the cognitive symptoms of the disease.

However, researchers at the National Institutes of Health recently discovered that important helper cells in the brain exhibit signs of **senescence** when exposed to amyloid plaques.<sup>3</sup> They hypothesized that this senescence plays an important role in the progression of Alzheimer’s disease and set out to test that theory.

Utilizing a mouse model of Alzheimer’s, these scientists used a **senolytic** treatment (dasatinib and quercetin) to rid the brain of these senescent cells. The results they found were remarkable. In the treated areas, inflammation was reduced, the amount of amyloid decreased, and most importantly, cognitive deficits in these mice were significantly improved.

This novel research opens the door to exploring senolytic therapy in humans to reverse the cognitive decline plaguing many older adults.

## Plant-Based Senolytics

As promising as these studies are, both rely on synthetic pharmaceutical drugs, navitoclax and dasatinib, whose side-effect profiles cause many people today to not want to take them yet.

But scientists have found another way to remove senescent cells using **plant-based** compounds found in commonly consumed food and beverages.

**Quercetin**, one of the senolytic compounds discussed previously in this magazine,<sup>15</sup> is a plant pigment found in small amounts in many fruits and vegetables, including onions, apples and berries. **Theaflavins**, natural compounds found in **black tea**, have also demonstrated senolytic effects in an animal study.<sup>16</sup>

In fact, **theaflavins** act by mechanisms that mimic those of *both* navitoclax and dasatinib. Like navitoclax, theaflavins inhibit the **Bcl-2** family of proteins, helping to push senescent cells into programmed cell death.<sup>17</sup> They also decrease the activity of **tyrosine kinase receptors**, one of the mechanisms **dasatinib** uses to help stop the spread of cancer cells.<sup>18</sup>

Theaflavins also modulate cellular pathways that are implicated in cellular senescence.<sup>16</sup>

By combining **quercetin** and **theaflavins**, scientists created a plant-based compound, available without a prescription, that provides senolytic action without resorting to pharmaceutical drugs.

## Summary

The field of **senolytics** is evolving rapidly. New research demonstrates the ability of these compounds to eliminate **senescent cells** that accelerate the aging process and contribute to degenerative disorders and dysfunction.

As we age, senescent cells accumulate in tissues, causing harmful, **chronic inflammation**.

**Senolytic** compounds hold great promise for clearing the body of these aged, toxic cells.

A new animal study of senolytics has demonstrated their ability to **clear the aging heart of senescent cells** and reduce disease-related heart enlargement and fibrosis.

**A first-ever human study** of senolytics was also recently published and showed that they can lead to functional improvements in pulmonary fibrosis patients.

As this field continues to show promise, scientists have combined two natural, plant-based senolytics, **quercetin** and **theaflavins**, into one supplement aimed at targeting and reducing the senescent cell burden. ●

## Cellular Senescence and Abnormal Blood Clotting

One of the ways senescent cells contribute to chronic disease is by spewing out hundreds of toxic proteins that degrade healthy tissues.

In addition to this effect, a newly published study has discovered that many of these secreted proteins also play roles in the control of blood clotting.<sup>19</sup> The study showed that these secretions promote clotting, potentially contributing to dangerous clots that block normal blood vessels and can lead to deep venous thrombosis, heart attack, stroke, and other clotting-related conditions.

Many factors can increase one's risk for abnormal clotting, including older age, cancer, sedentary lifestyle, and others. This clotting effect of senescent cells has important implications for individuals who are at high risk of clotting.

For example, the same study found that a common chemotherapy drug used to treat some forms of cancer, called **doxorubicin**, increases risk of clotting-related complications. However, removing senescent cells helped prevent this side-effect of doxorubicin.

These findings suggest that senolytic therapies may be potentially lifesaving in clinical situations where dangerous clotting is likely to occur.

**If you have any questions on the scientific content of this article, please call a Life Extension® Wellness Specialist at 1-866-864-3027.**

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Resolve the Epidemic of  
**Chronic  
Inflammation**



**Life Extension**<sup>®</sup> long ago observed older people who are “on fire” as a result of uncontrolled **inflammatory** reactions.

**Inflammation** causes or contributes to development of:

1. **Cancer**
2. **Dementia**
3. **Atherosclerosis**
4. **Frailty**
5. **Arthritis**
6. **Other degenerative disorders**

Normal aging is often accompanied by increased systemic inflammation.

This is evidenced by *higher* levels of inflammatory **blood markers** in elderly persons,<sup>1</sup> as well as outward symptoms like **persistent pain**.

Today’s consensus is that **chronic inflammation** is significantly involved with **degenerative aging**.<sup>2</sup>

Our ability to fully **resolve** stubborn inflammation *diminishes* in **older age**, thus worsening the systemic problems to which it contributes.<sup>3,4</sup>

Nutrients such as **curcumin** inhibit inflammation and reduce its severity.

Although inhibiting the onset of inflammation is important, emerging scientific research suggests this is only half of the equation. **Resolution** of inflammation may be as important as inhibition of inflammation.

**Resolution of inflammation** is an active, critical process that demands factors called specialized **pro-resolving mediators** (SPMs) to optimally manage the inflammatory process.

To this end, groundbreaking research has uncovered a method to **resolve inflammation** and **return tissues to a healthier and more youthful function**.<sup>5-7</sup>

## An Insidious Culprit

As we age, the risk of degenerative disease increases.

A central factor in age-associated illness is **chronic inflammation**. Many diseases of aging are closely linked with loss of youthful cellular function, and can be traced back to persistent and unresolved inflammatory reactions.<sup>2,3</sup>

Inflammation can be initiated and exacerbated in many ways including poor diet, environmental toxins, cigarette smoke, excess body weight, and aging (the term for this is **inflammaging**).

**Senescent cells** that accumulate with age release compounds that promote and maintain an environment of **chronic inflammation**.<sup>2,8-10</sup>

Some inflammatory reactions, such as cartilage destruction in joints, lead to outward symptoms like pain.

## Chronic inflammation

**Inflammaging**, however, may be silent and insidious. This is particularly troublesome with **vascular inflammation**, with no obvious warning signs until heart attack or stroke occurs.

Over time **chronic inflammation** damages cells, organs, and blood vessels, which leads to loss of function and exacerbates risk of common, age-related health problems.<sup>2,8-11</sup>

## Resolving Chronic Inflammation

Some dietary components like curcumin and ginger, and drugs like NSAIDs, **inhibit** and/or **reduce the severity** of inflammation. They do this by blocking the onset (or induction) of inflammation by reducing the production of compounds that start the inflammatory process.



**Inhibiting** the start of inflammation, however, is very different from facilitating the **resolution** of inflammation.

In the past, the **resolution** of inflammation was believed to be a passive process. This was incorrect.

Emerging scientific advances demonstrate that the **resolution** of inflammation is a dynamic, active process requiring *specialized factors* that facilitate resolution.

In a major finding, scientists have identified these specialized factors as lipid-based compounds that *actively* bring about the **resolution** of inflammation.

These compounds are called **specialized pro-resolving mediators** or **SPMs**.

Derived from specific types of polyunsaturated fatty acids, **SPMs** bind to specialized receptors on cells, organs, and blood vessels, actively helping to **resolve** the inflammatory process and allow the healing and **regeneration** of damaged tissues.

### Curcumin and SPMs: A Powerful One-Two Punch

**Specialized pro-resolving mediators** (SPMs) are naturally occurring **fatty acids** available in supplement form.

While **SPMs** can be used alone, taking them with other nutrients can provide optimal support.

Nutrients like **curcumin** have been shown to **inhibit** the initiation and reduce the severity of inflammation.

**SPMs**, on the other hand, actively help **resolve** ongoing inflammation.

By combining the use of nutrients like curcumin that help **inhibit** inflammation, and SPMs that help actively **resolve** ongoing inflammation, the detrimental effects of **chronic inflammation** can be mitigated.



## The Power of *Specialized Pro-Resolving Mediators*

**SPMs (specialized pro-resolving mediators)** fall into several inflammation-resolving sub-classes, and together, these SPMs can resolve inflammation and return tissues to normal function.

They accomplish this by their ability to do three vital tasks:<sup>5-7</sup>

- **REMOVE.** SPMs *activate macrophages*, which are immune system cells that remove the mess left behind from inflammation, including dead and dying cells and cellular debris. This cellular garbage must be cleaned up if healthy, surviving cells are to make a full recovery of function.
- **RESTORE.** SPMs *restore the healthy balance* of inflammatory compounds in the tissue, *reducing* the pro-inflammatory mediators while *increasing* compounds that have anti-inflammatory activity.
- **RENEW.** They *initiate and promote regeneration of tissues* that have been disrupted or damaged by inflammation.

The ability to resolve inflammation efficiently diminishes in older age, worsening the problem of inflammaging.<sup>3,4</sup>

A few examples of the importance of **SPMs** in resolving **inflammation** include published studies showing:

- 1) Reduced or dysfunctional SPMs found in the brains of mice and humans with Alzheimer's disease.<sup>12,13</sup>
- 2) Defective SPM resolution linked to the progression of atherosclerotic plaque and therefore, cardiovascular disease.<sup>14</sup>
- 3) Abnormalities of SPMs observed in conditions of insulin resistance like metabolic syndrome, as well as obesity.<sup>15-18</sup>

### How to Increase SPM Activity

Inspired by these findings, scientists sought to find a way to increase the presence of specialized pro-resolving mediators (SPMs) in the body, especially for aging individuals.

Researchers identified the specific SPM fatty acids due to their distinct bioactivity and their ability to effectively resolve ongoing inflammation. These natural, polyunsaturated, fatty acids are stable precursors to a wide array of different types of SPMs.<sup>7</sup>



## SPMs and Inflammation

- **Chronic inflammation** is a major contributor to almost every age-related disease and is a key cause of the aging process itself.
- Long thought to be a passive process, the **resolution of inflammation** is now known to be an active process, requiring several fatty-acid-derived compounds known as **specialized pro-resolving mediators (SPMs)**.
- These **SPMs** *remove* dead and dying cells and debris left over from inflammation, *restore* a healthy balance of pro- and anti-inflammatory mediators, and *renew* tissues by initiating healing and regeneration.
- In both animal and human models, aging is associated with **dysfunctional SPM pathways**, which in turn have been implicated in several age-related disorders. Higher **SPM** levels appear to be protective against these age-linked diseases.

SPMs help *resolve* inflammation and *restore* tissue function.

They do this via mechanisms different from anti-inflammatory nutrients and drugs that *inhibit* inflammation.

By providing these compounds to the body, the goal is to aid in the **resolution** of chronic inflammation, a critical component of any longevity regimen.

### New SPM Studies

The use of SPMs to treat disease and delay aging is cutting-edge science.<sup>19</sup>

Although the understanding of these natural fatty-acid compounds has been evolving for some time, the results of animal and human studies that demonstrate their impact on disease are relatively recent.

In an animal model of **osteoarthritis**, supplementation with a specialized pro-resolving mediator (SPM) known as **17-HDHA**, eliminated pain-linked behavior.<sup>20</sup>

In humans suffering from the same joint disease, higher blood levels of **17-HDHA** correlated with less pain.<sup>21</sup> These data suggest that systematically boosting levels of this SPM in the body may be a powerful tool to help resolve localized joint inflammation and pain.

Emerging research suggests that failure to effectively resolve inflammation is a key component in the development of age-related cognitive decline and **Alzheimer's-type dementia**. Studies have identified dysfunctional **SPM** pathways in Alzheimer's disease progression.

In an animal model of dementia, the SPM resolution responses were blunted, the likely factor for the observed decline in brain function.<sup>12</sup>

In humans, postmortem analysis of brain tissue from Alzheimer's patients suggests that the inflammation resolution pathway is dysfunctional compared to healthy brain tissue.<sup>13</sup>

The mouth is a common site of chronic inflammation, even with adequate dental hygiene. This can contribute to halitosis (bad breath), damage to teeth and gums (periodontal disease), and even systemic inflammation.

In experimental models, topical oral treatment with SPM resolvins helped diminish inflammation and initiate **regeneration** of bone, gums, and teeth that had been damaged.<sup>22,23</sup>

Other studies suggest that abnormalities in SPM pathways play a role in chronic diseases that have inflammation as a component, including kidney failure, liver impairment, diabetes, obesity, atherosclerosis, and coronary heart disease.<sup>14-16,24-29</sup>



### Anti-Inflammatory Compounds + SPMs as Adjuvants to Cancer Treatment

Surgery to remove malignant tumors and chemotherapy both aim to dramatically reduce the burden of cancer cells in the body. However, treatments such as these have the downside of stirring up inflammation in the area of the tumor, which can contribute to progression of the tumor and subsequent local recurrence or metastases.

Many years ago, **Life Extension** recognized the contribution that inflammation makes to the progression of cancer. At the time, we recommended anti-inflammatory treatments, such as **Lodine® (etodolac)**, a potent, non-steroidal anti-inflammatory drug (NSAID), as an adjuvant to other cancer therapies, to help reduce the risk of tumor recurrence and poor outcomes.

A recently published study has just validated this protective effect of anti-inflammatory therapies and took it a step further.<sup>30</sup> In animal models of cancer, administration of an NSAID medication (in this case **ketorolac**) and **resolvins** (a group of specialized pro-resolving mediators) before surgery or chemotherapy, prevented treatment-induced tumor progression. These two treatments had synergistic effects, maximizing each other's anti-cancer activities, and that led to superior long-term survival.

## Summary

**Inflammation** that remains ongoing and unresolved inflicts damage that contributes to accelerated aging and most degenerative disorders.

Nutrients like curcumin and ginger *inhibit* the onset of inflammation and help reduce the intensity of inflammation.

Older individuals, however, often need to better **resolve** inflammation in order to return tissues to more youthful function.

New research indicates that active *resolution* of inflammation can be accomplished with unique compounds known as **specialized pro-resolving mediators (SPMs)**.

Ongoing research indicates that these **SPM** compounds are critical for the *resolution* of active inflammation and the restoration of tissue health.

Additional findings suggest that many age-related diseases are linked with insufficient or inadequate **SPM activity**. ●

If you have any questions on the scientific content of this article, please call a Life Extension® Wellness Specialist at 1-866-864-3027.



### Specialized Pro-Resolving Mediators (SPMs)

**REMOVE** dead and dying cells left over from inflammation.

**RESTORE** healthy balance of pro- and anti-inflammatory mediators.

**RENEW** damaged tissue by initiating healing and regeneration.

## Harvard Magazine Publishes article about SPMs

A *Harvard Magazine* article published in 2019\* noted the work of Dr. Charles Serhan and other scientists who are doing research on resolving and reversing inflammation. "In experiments with animals deficient in SPMs [specialized pro-resolving mediators], Serhan has shown that injecting SPMs amplifies the magnitude of the healing response, causing injuries to mend more quickly," the author stated.

He went on to say that, "The SPMs instead work in concert with the immune response." They do this, according to Dr. Serhan, by stimulating macrophages, "to clear dead cells, debris, and bacteria. Then they bring the system back to homeostasis and begin to push the buttons to signal tissue regeneration."

\* Shaw J. Raw and Red-Hot: Could inflammation be the cause of myriad chronic conditions? *Harvard Magazine*, May-June 2019.

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## Inflammation Resolution

SPMs are **specialized pro-resolving mediators**.

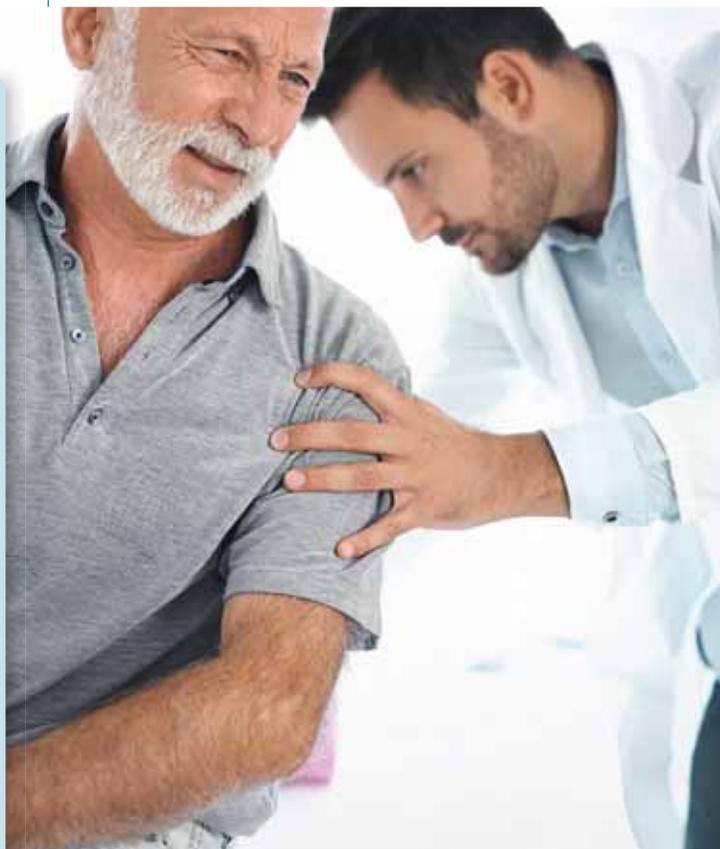
As their name implies, they don't inhibit inflammation—they initiate the **resolution of inflammation**.

There is growing consensus that **specialized pro-resolving mediators** can be a potent longevity intervention.<sup>19</sup>

Scientists have identified and isolated three important **SPMs** that may help the body safely *resolve* chronic inflammation and thereby reduce the damage of aging.

While SPMs can be used alone, by combining the use of **curcumin** (inhibit inflammation) and **SPMs** (resolve inflammation), inflammation can be effectively knocked out.

**Curcumin** blocks the initiation and reduces the severity of inflammation. SPMs take the next step and **resolve** it, allowing tissues to restore themselves and function in a healthy manner.



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A new ingredient called **SIBELIUS™**: **Sage Extract** demonstrated improvement in attention and memory performance in healthy, older volunteers.

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| Uridine-5'-monophosphate       | 50 mg  |
| Vinpocetine                    | 20 mg  |

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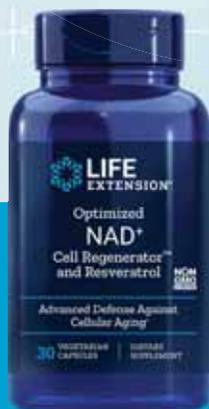
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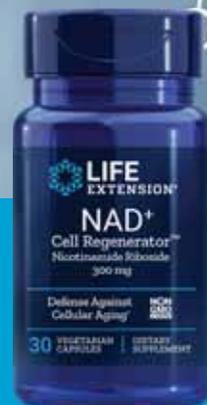
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# NITROVASC™ BOOST

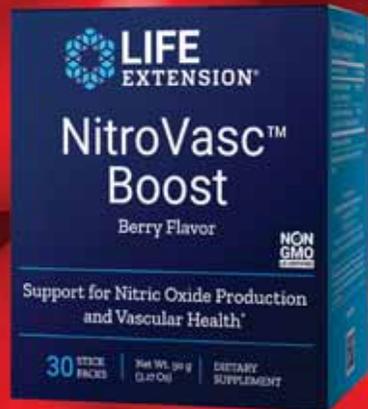
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# CoQ10

Continues to Impress  
Researchers



**Life Extension**® informed readers about **coenzyme Q10 (CoQ10)** in 1983.

Back in those early years, Americans did not know about CoQ10 even though it was widely prescribed in **Japan** to treat **heart failure**.

As clinical data mount about the ability of CoQ10 to improve **heart, brain, and kidney function**,<sup>1-5</sup> it has become a popular dietary supplement in the United States.

New findings reveal improved bone density,<sup>6,7</sup> reduced inflammation,<sup>5,8</sup> and protection against diabetic complications.<sup>9,10</sup>

But not everyone is garnering these benefits.

With age, the body's ability to fully utilize most commercial sources of CoQ10 (**ubiquinone**) diminishes.

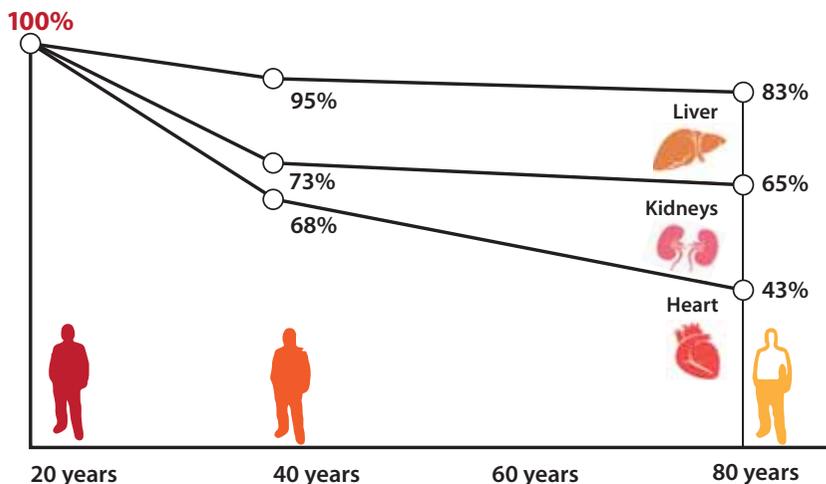
When using the **ubiquinol** form, more CoQ10 is **absorbed** and made bioavailable to tissues throughout the body.

In younger people, CoQ10 is abundantly produced naturally.

With age and/or use of **statin** drugs, internal production of **coenzyme Q10** plummets. The adverse consequence is systemic cellular energy depletion.

Supplementation with the **ubiquinol** form of CoQ10 can restore youthful CoQ10 blood levels and maximize its health-promoting effects.

### CoQ10 Decline with Age



Coenzyme Q10 levels decline with aging. For example, the **heart** of an **80-year-old** person may only contain **43%** of the **CoQ10** it had at age **20**.

Source: *Lipids*. 1989 Jul;24(7):579-84.



## What is Coenzyme Q10?

Coenzyme Q10 is found in every cell in our bodies. It's located in the energy generators of our cells called the **mitochondria**.

As CoQ10 declines with aging and use of statin drugs, cell energy production falls, resulting in impaired organ function.

CoQ10 helps protect **LDL** from oxidation that contributes to atherosclerosis.<sup>11</sup>

Small amounts of CoQ10 (about **3 mg to 6 mg**) can be acquired from meat and fish.<sup>12</sup> To achieve benefits identified in human studies, doses of **100 mg** a day and higher are needed.

## Ubiquinol Vs. Ubiquinone

**Ubiquinol** and **ubiquinone** are two forms of CoQ10, but they have different characteristics.

**Ubiquinone** is the *oxidized form* of CoQ10 found in most commercial supplements. When **ubiquinone** is ingested, it must first be *converted* in the body to the active ubiquinol form.<sup>13</sup>

**Ubiquinol**, on the other hand, is readily available and highly **absorbable** for immediate use by cells. One study showed that ubiquinol supplementation increased CoQ10 blood levels by nearly **five times** from baseline.<sup>14</sup>

This means that **ubiquinol** is more efficient at increasing plasma levels of CoQ10 than ubiquinone.

**Ubiquinol** also penetrates into diverse tissues in the body.<sup>15,16</sup> This includes crossing the **blood-brain barrier** to help energize brain cells.

In healthy, younger individuals, **ubiquinol** makes up at least **95%** of all the CoQ10 in the plasma.<sup>17,18</sup>

In the elderly, particularly those with chronic disease, the percentage of the *oxidized ubiquinone* form of CoQ10 increases, leaving less **ubiquinol**.<sup>19</sup>

For aging people seeking *higher* CoQ10 bioavailability, **ubiquinol** is the preferred choice.

## CoQ10 and Heart Health

Doctors who prescribe **statin** drugs to lower cholesterol often recommend that patients increase their intake of coenzyme Q10 during treatment.

There are two reasons: Statins decrease levels of CoQ10 in the body,<sup>20-25</sup> and supplementation may help reduce some side effects of statins, like muscle soreness and liver damage.<sup>25-28</sup>

Beyond those beneficial effects, CoQ10 also supports **cardiovascular health**.<sup>1,2,13,29-33</sup>

In patients treated with statins for high cholesterol, studies have demonstrated that adding coenzyme Q10 (**200 mg** per day) in conjunction with **fish oil**

(**1,560 mg EPA/465 mg DHA**) significantly reduced blood pressure, markers of inflammation, and lipid levels.<sup>30</sup>

Even *without* the use of a statin drug, coenzyme Q10 alone (**120 mg** daily) decreased LDL ("bad") cholesterol by **6.5%** and lowered blood pressure in a recent study.<sup>13</sup>

Studies have also shown that coenzyme Q10 can benefit patients suffering from **heart failure**.

In a placebo-controlled study of heart failure patients, the group supplementing with **CoQ10** had improved exercise capacity, decreased occurrence of cardiac-related events—and a **significantly reduced, overall cardiac-related mortality**.<sup>1,2</sup>

In 2018, researchers analyzed patients many years after supplementation with coenzyme Q10 and selenium. They found that those who had been treated continued to exhibit a significant reduction in risk for cardiovascular-related death **12 years later**.<sup>29</sup>





### Brain Benefits

Coenzyme Q10 has been found to offer several benefits to the brain and nervous system.<sup>3,4,34-37</sup>

In rats exposed to traumatic **brain injury**, CoQ10 demonstrates the ability to reduce the severity of brain-cell damage.<sup>36</sup> Rodent models of **stroke** show that CoQ10 lessens the damage seen in the brain and reduces markers of oxidative stress, inflammation, and cell death in affected tissues.<sup>34,35</sup>

In animal models of **Parkinson's disease**, CoQ10 leads to improvements on behavioral tests and slows the progression of the disease.<sup>38,39</sup>

In cell and mouse models of **Alzheimer's disease**, CoQ10 was found to improve memory and limit the damage caused by **amyloid**, a harmful protein that is implicated in the deterioration of brain function.<sup>40,41</sup>

Human studies have demonstrated brain-health benefits of coenzyme Q10. For example, a study of **migraine** sufferers who supplemented with **100 mg** to **400 mg** per day of CoQ10 showed clinical improvement, including decreased frequency, severity, and duration of migraine haedaches.<sup>3,4</sup>

### Vital for Overall Health

- **Coenzyme Q10 (CoQ10)** is an important compound required for the processes that supply energy to cells and to protect from the damaging effects of free radicals.
- In addition to reducing side effects of cholesterol-lowering **statin** drugs, CoQ10 has been linked to protection from cardiovascular disease, neurological conditions, age-related bone loss, metabolic disorders like obesity and diabetes, and more.
- There are two forms of CoQ10: **ubiquinol** and **ubiquinone**. Studies have shown that **ubiquinol** is more easily absorbed, making it the preferred type in supplements.
- Supplementation with **100 mg** to **400 mg** per day of **ubiquinol** CoQ10 is safe and has been associated with health benefits in various human studies. Higher doses (**400 mg/day**) are often prescribed by cardiologists for heart failure patients.

## Shilajit Boosts the Actions of CoQ10

**Shilajit** is a substance arising from the decomposition of various plants. It has been widely used for centuries in traditional Indian medicine to promote physical and mental health.

Shilajit contains a wide mix of minerals and organic compounds. Among these are compounds whose actions complement those of coenzyme Q10.

Experimental studies have shown that CoQ10 and shilajit work together to **boost cellular energy production** more than either nutrient alone.<sup>54,55</sup>

Compounds in shilajit also stabilize CoQ10 so that it is not broken down and can continue to work longer.<sup>54,56</sup>

**Fulvic acid**, one of the principal components of shilajit, has promising potential for chronic inflammatory diseases. Fulvic acid directly stimulates energy production by mitochondria, further augmenting the effects of CoQ10.<sup>57</sup>

## Metabolic Health

While CoQ10 is best known for its impact on cellular energy and heart health, research shows that it also plays a role in maintaining metabolic health.

Plasma levels of **ubiquinol** are often reduced in patients with **type II diabetes**.<sup>42</sup> Experimental and clinical evidence suggests that supplementation with coenzyme Q10 helps improve glucose control, insulin, and fat metabolism.<sup>9,42-46</sup>

A recent review of 14 different trials, including close to 700 overweight/obese diabetic subjects, showed that supplementation with CoQ10 reduced levels of **triglycerides, glucose, fasting insulin, and hemoglobin A1c**.<sup>44</sup>

CoQ10 also has favorable effects on metabolic health and markers of **inflammation** in people suffering from **kidney disease**, a common diabetic complication.<sup>9,10</sup>

## Better Bones

Aging often leads to **osteoporosis**, a decline in bone density that increases the risk for fractures. Osteoporosis is a major contributor to disability and death in the elderly.<sup>47</sup>



Healthy bones require constant remodeling, a balance between bone breakdown and new bone growth. If the balance leans towards more breakdown and less new bone formation, bones grow thin and fragile.

In preclinical studies, coenzyme Q10 demonstrated the ability to prevent age-related decline in bone density, decreasing breakdown of bone while boosting new bone formation and stimulating the growth of bone-forming **osteoblast** cells.<sup>6,7</sup>

## Other Benefits

Researchers are constantly exploring potential new uses for CoQ10.

Recent evidence suggests that it enhances the sensitivity to chemotherapy and radiation of human glioblastoma cells (a deadly form of brain cancer).<sup>48</sup> CoQ10 may even inhibit the activity of some cells associated with the development of pancreatic cancer.<sup>49</sup>

CoQ10 has also been found to decrease markers of **chronic inflammation**. As people age, inflammatory markers increase and contribute to a host of degenerative disorders.<sup>5,8,50</sup>

Studies show that CoQ10 helps *increase* levels of beneficial hormones that decline with age, such as insulin-like growth factor,<sup>51</sup> and *decrease* compounds associated with **inflammation**, such as C-reactive protein and tumor necrosis factor.<sup>52</sup> This makes it a powerful supplement for anti-aging and disease risk-reduction strategies.

A recent, systematic analysis of **clinical trials** suggests that CoQ10 supplementation could be effective at alleviating **fatigue**.<sup>53</sup>

## Summary

**Coenzyme Q10** has been linked to better cardiovascular, neurological, metabolic, and bone health.

CoQ10 comes in two forms, **ubiquinol** and **ubiquinone**, but they're *not* the same. **Ubiquinol** is the form responsible for its health benefits, and it's more easily **absorbed** than ubiquinone.

While *younger* people can benefit from either form, maturing individuals should consider **ubiquinol** because their internal production of CoQ10 is so deficient.

The chart on this page shows how CoQ10 levels plummet in response to **statin drug** use. The chart also reveals that normal, aged people already have **less-than-optimal** CoQ10 blood levels.

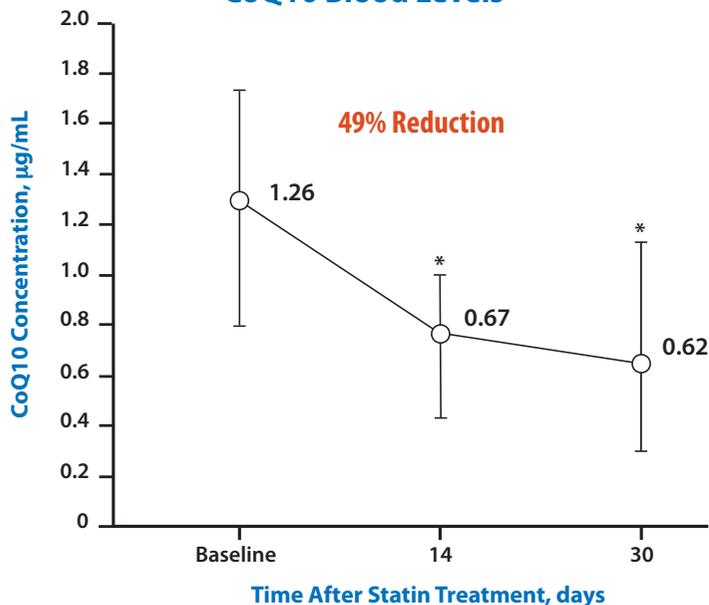
Taking **100 mg** and more of the **ubiquinol** form of coenzyme Q10 with a fatty meal can help older individuals lead a longer, healthier life. ●

If you have any questions on the scientific content of this article, please call a Life Extension® Wellness Specialist at 1-866-864-3027.

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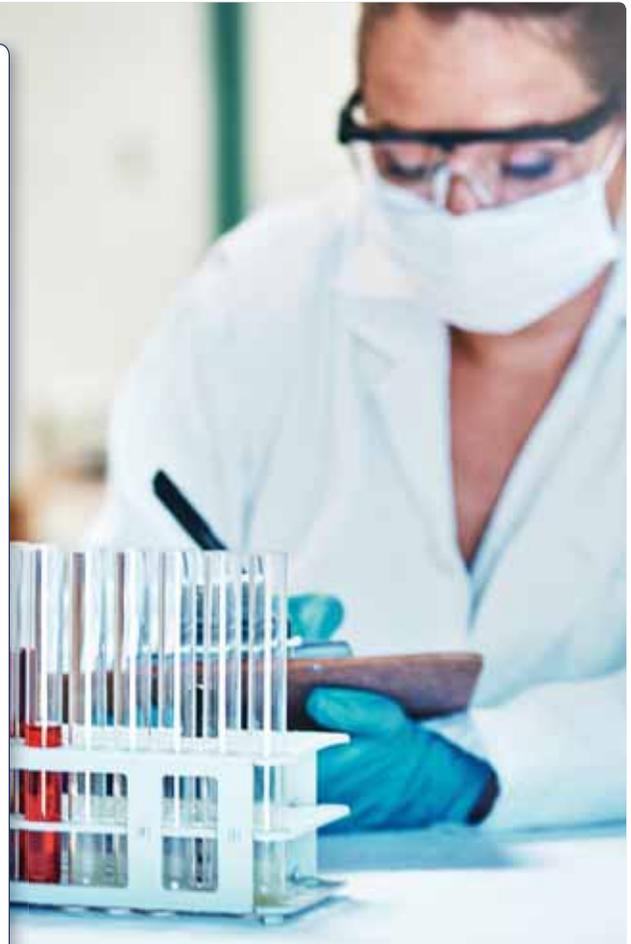
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### Statin Treatment Decreases CoQ10 Blood Levels



Source: *Arch Neurol.* 2004;61(6):889-892.

This study of people with an average age of 70 shows CoQ10 blood levels at baseline of only **1.26 mcg/mL**. Optimal levels should be between **2-3 mcg/mL**. Statin drug use causes these already low CoQ10 blood levels to drop to **0.62 mcg/mL**. According to cardiologist Peter Langsjoen, MD, heart failure patients should strive for CoQ10 blood levels of around **4 mcg/mL** and higher.<sup>62</sup>





### Statin Drugs Lower Coenzyme Q10 Levels

Roughly **30%** of all adults in the U.S. take prescription **statin** drugs to lower levels of LDL cholesterol, such as atorvastatin (Lipitor®), simvastatin (Zocor®), and pravastatin (Pravachol®).<sup>58</sup>

But long-term use of these drugs has a risk: low levels of coenzyme Q10.<sup>59,60</sup> The action statins take to block an enzyme that increases cholesterol production also blocks production of CoQ10 in the body, leading to a deficiency.

As a result, many experts recommend that people taking statin medication increase their intake of CoQ10. Due to its superior bioavailability, **ubiquinol** can best replenish low levels of CoQ10.<sup>61</sup>

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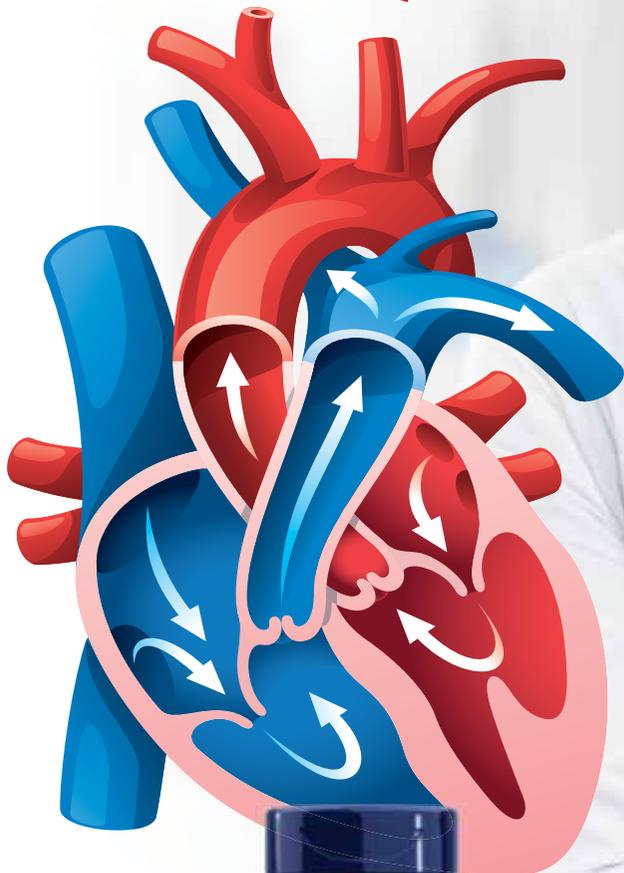
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- 00451 MSM (Methylsulfonylmethane)
- 02231 NT2 Collagen™

**KIDNEY & BLADDER SUPPORT**

- 00862 Cran-Max® Cranberry Whole Fruit Concentrate
- 01424 Optimized Cran-Max® with Ellirose™
- 01921 Uric Acid Control
- 01209 Water-Soluble Pumpkin Seed Extract

**LIVER HEALTH & DETOXIFICATION**

- 02240 Anti-Alcohol HepatoProtection Complex
- 01651 Calcium D-Glucarate
- 00550 Chlorella
- 01571 Chlorophyllin
- 01922 European Milk Thistle • 60 softgels
- 01925 European Milk Thistle • 120 softgels
- 01522 European Milk Thistle • 60 veg capsules
- 01541 Glutathione, Cysteine & C
- 01393 HepatoPro
- 01608 Liver Efficiency Formula
- 01534 N-Acetyl-L-Cysteine

- 00342 PectaSol-C® Modified Citrus Pectin Powder
- 01080 PectaSol-C® Modified Citrus Pectin Capsules
- 01884 Silymarin

**LONGEVITY & WELLNESS**

- 00457 Alpha-Lipoic Acid
- 01625 AppleWise Polyphenol Extract
- 01214 Blueberry Extract
- 01438 Blueberry Extract with Pomegranate
- 02270 DNA Protection Formula
- 02119 GEROPROTECT® Ageless Cell™
- 02133 GEROPROTECT® Longevity A.I.™
- 02211 Grapeseed Extract
- 02109 Mediterranean Whole Food Blend
- 00954 Mega Green Tea Extract (decaffeinated)
- 00953 Mega Green Tea Extract (lightly caffeinated)
- 01513 Optimized Fucoidan with Maritech® 926
- 02230 Optimized Resveratrol
- 01637 Pycnogenol® French Maritime Pine Bark Extract
- 02210 Resveratrol
- 00070 RNA (Ribonucleic Acid)
- 02301 Senolytic Activator
- 01208 Super R-Lipoic Acid
- 01919 X-R Shield

**MEN'S HEALTH**

- 02209 Male Vascular Sexual Support
- 00455 Mega Lycopene Extract
- 02306 Men's Bladder Control
- 01789 PalmettoGuard® Saw Palmetto with Beta-Sitosterol
- 01790 PalmettoGuard® Saw Palmetto/Nettle Root Formula with Beta-Sitosterol
- 01837 Pomi-T®
- 01373 Prelox® Enhanced Sex for Men
- 01940 Super MiraForte with Standardized Lignans
- 01909 Triple Strength ProstaPollen™
- 02029 Ultra Prostate Formula

**MINERALS**

- 01661 Boron
- 02107 Extend-Release Magnesium
- 30731 Ionic Selenium
- 01677 Iron Protein Plus
- 01459 Magnesium Caps
- 01682 Magnesium (Citrate)
- 01328 Only Trace Minerals
- 01504 Optimized Chromium with Crominex® 3+
- 02309 Potassium with Extend-Release Magnesium
- 01740 Sea-Iodine™
- 01879 Se-Methyl L-Selenocysteine
- 01778 Super Selenium Complex
- 00213 Vanadyl Sulfate
- 01813 Zinc Caps

**MISCELLANEOUS**

- 00577 Potassium Iodide
- 00657 Solarshield® Sunglasses

**MOOD & STRESS MANAGEMENT**

- 02312 Cortisol-Stress Balance
- 00987 Enhanced Stress Relief
- 01074 5 HTP
- 01683 L-Theanine
- 02175 SAMe (S-Adenosyl-Methionine)  
200 mg, 30 enteric coated tablets
- 02176 SAMe (S-Adenosyl-Methionine)  
400 mg, 30 enteric coated tablets
- 02174 SAMe (S-Adenosyl-Methionine)  
400 mg, 60 enteric coated tablets

**MULTIVITAMINS**

- 02199 Children's Formula Life Extension Mix™
- 02398 Comprehensive Nutrient Packs ADVANCED
- 02354 Life Extension Mix™ Capsules
- 02364 Life Extension Mix™ Capsules without Copper
- 02356 Life Extension Mix™ Powder
- 02355 Life Extension Mix™ Tablets
- 02357 Life Extension Mix™ Tablets with Extra Niacin
- 02365 Life Extension Mix™ Tablets without Copper
- 02292 Once-Daily Health Booster • 30 softgels
- 02291 Once-Daily Health Booster • 60 softgels
- 02313 One-Per-Day Tablets
- 02317 Two-Per-Day Capsules • 60 capsules
- 02314 Two-Per-Day Capsules • 120 capsules
- 02316 Two-Per-Day Tablets • 60 tablets
- 02315 Two-Per-Day Tablets • 120 tablets

**NERVE & COMFORT SUPPORT**

- 02202 ComfortMAX™
- 02303 PEA Discomfort Relief

**PERSONAL CARE**

- 01006 Biosil™ • 5 mg, 30 veg capsules
- 01007 Biosil™ • 1 fl oz
- 00321 Dr. Proctor's Advanced Hair Formula
- 00320 Dr. Proctor's Shampoo
- 02322 Hair, Skin & Nails Collagen Plus Formula
- 01278 Life Extension Toothpaste
- 00408 Venotone
- 00409 Xyliwhite Mouthwash
- 02304 Youthful Collagen
- 02252 Youthful Legs

**PET CARE**

- 01932 Cat Mix
- 01931 Dog Mix

**PROBIOTICS**

- 01622 Bifido GI Balance
- 01825 FLORASSIST® Balance
- 02125 FLORASSIST® GI with Phage Technology
- 01821 FLORASSIST® Heart Health
- 02250 FLORASSIST® Mood Improve
- 02208 FLORASSIST® Nasal
- 02120 FLORASSIST® Oral Hygiene
- 02203 FLORASSIST® Prebiotic
- 01920 FLORASSIST® Throat Health
- 02400 FLORASSIST® Winter Immune Support
- 52142 Jarro-Dophilus® for Women
- 00056 Jarro-Dophilus EPS® • 60 veg capsules
- 21201 Jarro-Dophilus EPS® • 120 veg capsules
- 01038 Theralac® Probiotics
- 01389 TruFlora® Probiotics

**SKIN CARE**

- 80157 Advanced Anti-Glycation Peptide Serum
- 80165 Advanced Growth Factor Serum
- 80170 Advanced Hyaluronic Acid Serum
- 80154 Advanced Lightening Cream
- 80155 Advanced Peptide Hand Therapy
- 80152 Advanced Triple Peptide Serum
- 80140 Advanced Under Eye Serum with Stem Cells
- 80137 All-Purpose Soothing Relief Cream
- 80139 Amber Self MicroDermAbrasion
- 80118 Anti-Aging Mask
- 80151 Anti-Aging Rejuvenating Face Cream
- 80153 Anti-Aging Rejuvenating Scalp Serum
- 80133 Anti-Oxidant Facial Mist Hydrator
- 80156 Collagen Boosting Peptide Serum

- 80169 Cucumber Hydra Peptide Eye Cream
- 80141 DNA Support Cream
- 80167 Environmental Support Serum
- 80163 Eye Lift Cream
- 80123 Face Rejuvenating Anti-Oxidant Cream
- 80109 Hyaluronic Facial Moisturizer
- 80110 Hyaluronic Oil-Free Facial Moisturizer
- 80138 Hydrating Anti-Oxidant Facial Mist
- 00661 Hydroderm
- 80103 Lifting & Tightening Complex
- 80168 Melatonin Advanced Peptide Cream
- 80114 Mild Facial Cleanser
- 80172 Multi Stem Cell Hydration Cream
- 80159 Multi Stem Cell Skin Tightening Complex
- 80122 Neck Rejuvenating Anti-Oxidant Cream
- 80174 Purifying Facial Mask
- 01448 Rejuvenex® Body Lotion
- 01621 Rejuvenex® Factor Firming Serum
- 80150 Renewing Eye Cream
- 80142 Resveratrol Anti-Oxidant Serum
- 01938 Shade Factor™
- 02129 Skin Care Collection Anti-Aging Serum
- 02130 Skin Care Collection Day Cream
- 02131 Skin Care Collection Night Cream
- 80166 Skin Firming Complex
- 02096 Skin Restoring Ceramides
- 80130 Skin Stem Cell Serum
- 80164 Skin Tone Equalizer
- 80143 Stem Cell Cream with Alpine Rose
- 80148 Tightening & Firming Neck Cream
- 80161 Triple-Action Vitamin C Cream
- 80162 Ultimate MicroDermabrasion
- 80173 Ultimate Peptide Serum
- 80160 Ultra Eyelash Booster
- 01220 Ultra Rejuvenex®
- 00676 Ultra RejuveNight®
- 80101 Ultra Wrinkle Relaxer
- 80113 Under Eye Refining Serum
- 80104 Under Eye Rescue Cream
- 80171 Vitamin C Lip Rejuvenator
- 80129 Vitamin C Serum
- 80136 Vitamin D Lotion
- 80102 Vitamin K Cream

**SLEEP**

- 01512 Bioactive Milk Peptides
- 02300 Circadian Sleep
- 01551 Enhanced Sleep with Melatonin
- 01511 Enhanced Sleep without Melatonin
- 02234 Fast-Acting Liquid Melatonin
- 01669 Glycine
- 02308 Herbal Sleep PM
- 01722 L-Tryptophan
- 01668 Melatonin • 300 mcg, 100 veg capsules
- 01083 Melatonin • 500 mcg, 200 veg capsules
- 00329 Melatonin • 1 mg, 60 capsules
- 00330 Melatonin • 3 mg, 60 veg capsules
- 00331 Melatonin • 10 mg, 60 veg capsules
- 00332 Melatonin • 3 mg, 60 veg lozenges
- 02201 Melatonin IR/XR
- 01787 Melatonin 6 Hour Timed Release  
300 mcg, 100 veg tablets
- 01788 Melatonin 6 Hour Timed Release  
750 mcg, 60 veg tablets
- 01786 Melatonin 6 Hour Timed Release  
3 mg, 60 veg tablets
- 01721 Optimized Tryptophan Plus
- 01444 Quiet Sleep
- 01445 Quiet Sleep Melatonin

**VITAMINS**

- 01533 Ascorbyl Palmitate
- 00920 Benfotiamine with Thiamine
- 00664 Beta-Carotene
- 01945 BioActive Complete B-Complex
- 00102 Biotin
- 00084 Buffered Vitamin C Powder
- 02229 Fast-C® and Bio-Quercetin Phytosome
- 02075 Gamma E Mixed Tocopherol Enhanced with  
Sesame Lignans
- 02070 Gamma E Mixed Tocopherol/Tocotrienols
- 01913 High Potency Optimized Folate
- 01674 Inositol Caps Liquid Emulsified
- 02244 Liquid Vitamin D3 • 2,000 IU, 1 fl oz
- 02232 Liquid Vitamin D3 • 2,000 IU, 1 fl oz, mint
- 01936 Low-Dose Vitamin K2
- 01536 Methylcobalamin • 1 mg, 60 veg lozenges
- 01537 Methylcobalamin • 5 mg, 60 veg lozenges
- 00065 MK-7
- 00373 No Flush Niacin
- 01939 Optimized Folate (L-Methylfolate)
- 01217 Pyridoxal 5'-Phosphate Caps
- 01400 Super Absorbable Tocotrienols
- 02334 Super K
- 02335 Super K Elite
- 01863 Super Vitamin E
- 02028 Vitamin B5 (Pantothenic Acid)
- 01535 Vitamin B6
- 00361 Vitamin B12
- 02228 Vitamin C and Bio-Quercetin Phytosome  
1,000 mg, 60 veg tablets
- 02227 Vitamin C and Bio-Quercetin Phytosome  
1,000 mg, 250 veg tablets
- 01753 Vitamin D3 • 1,000 IU, 90 softgels
- 01751 Vitamin D3 • 1,000 IU, 250 softgels
- 01713 Vitamin D3 • 5,000 IU, 60 softgels
- 01718 Vitamin D3 • 7,000 IU, 60 softgels
- 01758 Vitamin D3 with Sea-Iodine™
- 02040 Vitamins D and K with Sea-Iodine™

**WEIGHT MANAGEMENT & BODY COMPOSITION**

- 00658 7-Keto® DHEA Metabolite • 25 mg, 100 capsules
- 02479 7-Keto® DHEA Metabolite • 100 mg, 60 veg capsules
- 01509 Advanced Anti-Adipocyte Formula
- 01807 Advanced Appetite Suppress
- 02207 AMPK Metabolic Activator
- 01823 CalReduce Selective Fat Binder
- 02478 DHEA Complete
- 01738 Garcinia HCA
- 29754 HCAActive Garcinia Cambogia Extract
- 01292 Integra-Lean®
- 01908 Mediterranean Trim with Sinetrol™ -XPur
- 01492 Optimized Irvingia with Phase 3™ Calorie Control Complex
- 01432 Optimized Saffron with Satiereal®
- 00818 Super CLA Blend with Sesame Lignans
- 01902 Waist-Line Control™
- 02151 Wellness Code® Appetite Control

**WOMEN'S HEALTH**

- 01942 Breast Health Formula
- 01626 Enhanced Sex for Women 50+
- 01894 Estrogen for Women
- 01064 Femmenessence MacaPause®
- 02204 Menopause 731™
- 02319 Prenatal Advantage
- 01441 Progesta-Care®
- 01649 Super-Absorbable Soy Isoflavones

# YOUR BONE HEALTH ... NOW **BOOSTED**

Bone Restore with Vitamin K2 combines skeletal-strengthening nutrients in one highly absorbable formula.



**SUPER SALE PRICING!**

Item #01727 • 120 capsules

1 bottle **\$16.20**

4 bottles \$14.85 each

For full product description and to order **Bone Restore with Vitamin K2**, call **1-800-544-4440** or visit **LifeExtension.com**

Note: Those taking the anticoagulant drug Coumadin® (warfarin) should use Bone Restore without vitamin K2.

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These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.

# Road Trip!

NON-STOP

*"Thanks,  
Ultra Prostate  
Formula."*

## Ultra Prostate Formula can help:

- Support healthy urination
- Promote healthy prostate size and function
- Encourage healthy inflammatory response
- Help inhibit PSA activity

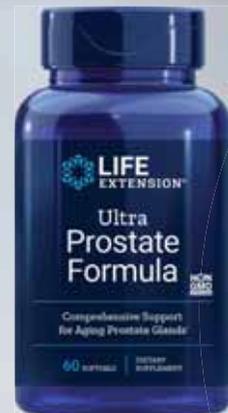
For full product description and to order  
**Ultra Prostate Formula**, call **1-800-544-4440**  
or visit **[www.LifeExtension.com](http://www.LifeExtension.com)**

**SUPER SALE PRICING!**

Item #02029 • 60 softgels

1 bottle **\$25.65**

4 bottles \$23.63 each



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WHAT'S INSIDE

# Super\$Sale



## ENHANCED CURCUMIN AT A LOWER PRICE

A **new turmeric blend** delivers a **45-fold** plasma **increase** in **free curcuminoids** that **inhibits** chronic inflammation involved in **age-related disorders**.



## RESOLVE AND REPAIR INFLAMMATORY DAMAGE

Researchers have identified **pro-resolving mediators** that help **restore** tissues injured by inflammation to more youthful function.



## COMBAT AGING BY REMOVING SENESCENT CELLS

Prestigious published studies reveal marked improvements when **senolytics** are used to reduce the **senescent cell burden**.



## CoQ10 CONTINUES TO IMPRESS

**CoQ10** helps maintain bone density, improve neurological function, and protect against diabetic complications, along with its heart and kidney benefits.

**Annual SUPER SALE begins November 11, 2019**